

EXPRESS MAIL LABEL NO.EL449645501US FILING DATE: May 23, 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**APPLICATION FOR LETTERS PATENT
(UTILITY PATENT)**

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INVENTION TITLE: **VIBRATION REDUCING DEVICES FOR BOWS**

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TO: Honorable Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

Your applicant, named above hereby petitions for grant of a utility patent to him or any assignee of record, at the time of issuance, for an invention more particularly described in the following specification and claims, with the accompanying drawings, verified by the accompanying Declaration and entitled:

VIBRATION REDUCING DEVICES FOR BOWS

CROSS REFERENCE TO RELATED APPLICATIONS

1 This application claims priority of Provisional Application Number 60/206,250, entitled
SILENT WAVE - VIBRATION REDUCING DEVICES FOR BOWS filed on May 23, 2000,
and the content which is incorporated herein by reference.

FIELD AND BACKGROUND OF THE INVENTION

2 The present invention relates to vibration dampeners, and more specifically to archery
bow dampeners for torque and vibration reduction of the bow limbs and dampening and
absorbing shocks and vibrations, in various parts of the bow.

3 As the arrow is released from the bow and immediately afterwards, an extreme vibration is
generated in different parts of the bow. The shock is created due to the abrupt return of the limbs
and the string of the archery bow to their original positions. It robs the arrow of energy and
negatively effects the accuracy and speed. It effects the joints of the archer in an adverse way. It
loosens up components of the bow and it shortens the life of the limbs.

4 To overcome this problem, dampeners, which were developed for non-archery application,
have been applied to archery bows for absorbing longitudinal vibrations. However, none have
overcome adequately the problem of reducing torsional vibration of the limbs as well as the
longitudinal vibrations. Also, the vibration mode is complicated; bow limbs tend to oscillate
independently of each other resulting in a mixed vibrational mode of limbs twisting and bending
simultaneously, thereby requiring multiple dampening devices.

5 One prior art device was designed for baseball bats, tennis rackets and other impact
implements, which encompass a 360-degree arc and are normal to the longitudinal axis of the
accessory. See U.S. patent 5,362,046. Although this device dampens vibrations fairly well, it is
not as effective as a device designed to work in the same plane as the limbs of the bow.

6 It is an object of the present invention to dampen and absorb shocks and vibrations in
limbs and other parts of the bow.

7 It is a further object of the present invention to control the torque of the limbs.

SUMMARY OF THE INVENTION

8 The objects set forth above as well as further and other objects and advantages of the present invention are achieved by a dampening system that dampens the vibrations generated by the limbs of the bow. It could be applied in various locations of the bow (e.g. limbs, riser, accessories, etc.), where vibration is a present. The general shape of this device is a wedge or combination of wedges made of a single elastomeric material or a combination of elastomers. The device takes the form, in some preferred embodiments, of a base portion affixed to a limb and a portion suspended over the limb. There are many variations of the volume proportions of the area of the base portion that comes in direct contact with the limb and the proportion that is suspended above the limb. Also, where multiple elastomers are used the combination of different Shore hardness of the elastomers can range from 0-60. The preferred form of such a wedge device is approximately 65mm long by 15mm wide and 25mm high, but dimensions can vary depending on the size and power of the bows and cross bows.

9 One class of preferred embodiments comprises a one-piece wedge design with the entire length of a bottom plane of the device adhered to the bow via a flexible plastic plate permanently attached to the dampener. The plate has an adhesive layer for securely attaching the device to the bow. The device can be attached to the bow by other suitable means of adhesion or fastening. Other classes of preferred embodiments include a two part construction with an inner wedge inserted into a notch of the device. Other variations within the scope of the invention include diverse uses of materials (e.g. metals and plastics) and diverse amounts of protrusion of the inner wedge.

For a better understanding of the present invention, together with other and further objects thereof, reference is made to the accompanying drawings and detailed description and its scope will be pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

11 FIGS. 1 and 2 are side and front views of a bow showing four emplaced wedge-form dampeners;

12 FIG 3 is an isometric pictorial view of a preferred embodiment of the dampener and FIGS. 4 and 5 are end and top views thereof;

13 FIGS 6 and 7 are isometric views of alternative preferred embodiments of the dampener with two-piece construction; and

14 FIG. 8 is a perspective view of a bow.

test rig

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS 1 and 2 illustrate a bow with the device (10) of a preferred embodiment of the invention placed symmetrically on the bow. The dampener is shown further in FIGS. 3-5 to have a base section 12 and an extending substantially triangular extension (wedge end) 14. A plate 13 (FIG. 3) is provided on the base portion connected thereto and has an adhesive face A (which can be overlaid with a protective liner (not shown) - for storage and transport). Although, this is the preferred method of attachment it is not the only method. The device can be attached to the bow by other suitable means of adhesion or fastening.

FIG. 6 shows another form 110 of the device with an insert 116 in a wedge portion 114. The device consists of two parts made of elastomer with different durometers. A base 113 of a shortened length of the device adheres to the bow. The other half part of base 113 and its 114 extension including insert 116 is suspended above the limb. The device has a flexible plastic plate permanently attached to it. On the bottom of the plate is adhesive tape A for securely attaching the device to the bow.

Fig. 7 shows another embodiment 21 of the device with an insert 216 made of elastomers of different durometers, The entire length of the bottom of the device plate 213 with adhesive A adhered to the bow.

In the various embodiments the devices are attached to various locations on the limbs of the bow. After the arrow is released, the limbs generate intense vibration. By oscillating independently from the limbs, the device speedily and effectively dampens the vibration of the limbs and reduces the noise associated with it.

FIG. 8 shows a test rig used in MIT's Harold Edgerton laboratory to evaluate the dampener of the invention and U.S. 5,362,046 of November 8, 1994 (S.C. Sims). Amplitude and frequency of oscillation (and acceleration) of the bow were measured without dampeners and with respective dampeners attached. Those tests were supplemented by stroboscopic photography. Similar tests were made with a hand held bow. Both forms of dampeners significantly reduced vibration of the bow. Also the present invention had noticeable improvement over the dampener of the '046 patent in reduction of amplitude of the acceleration waveform for bow vibration, particularly in a 40-60 millisecond time range (after string release).

The dampener devices can be placed at various bow locations for good effect (preferably near outer extremities of the bow, as shown. But placement on the bow riser and other locations can also be made beneficially.

A wide range of adhesives can be used for affixing each dampener to a bow including super glue, general purpose glue, epoxy resin, acrylic resin, urethane, resin, cement, natural gums and resins, mucilage, starch and starch derivatives, rubber adhesives, cellulose derivatives, or combinations thereof.

In addition to or in lieu of adhesive fastening, mechanical fasteners can be used including screws, nails, clips, channels, bands, ties and the like.

20 Although the invention has been described with respect to various embodiments, it should be realized this invention is also capable of a wide variety of further and other embodiments within the spirit and scope of the appended claims.

What is claimed is:

Patented Oct 4, 1960